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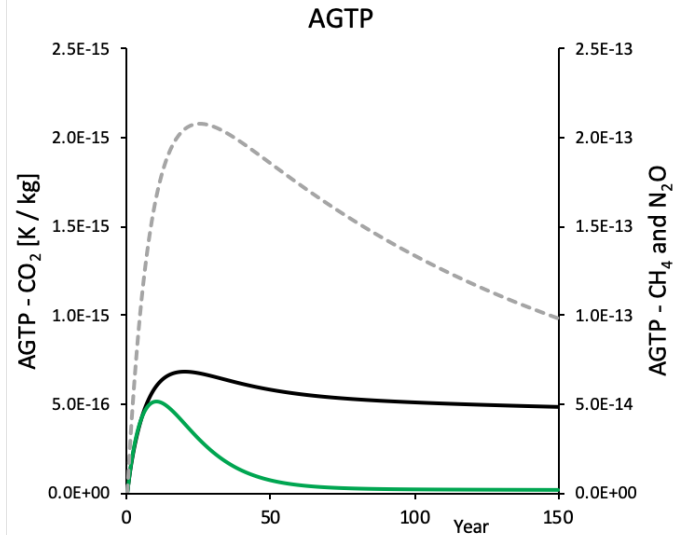
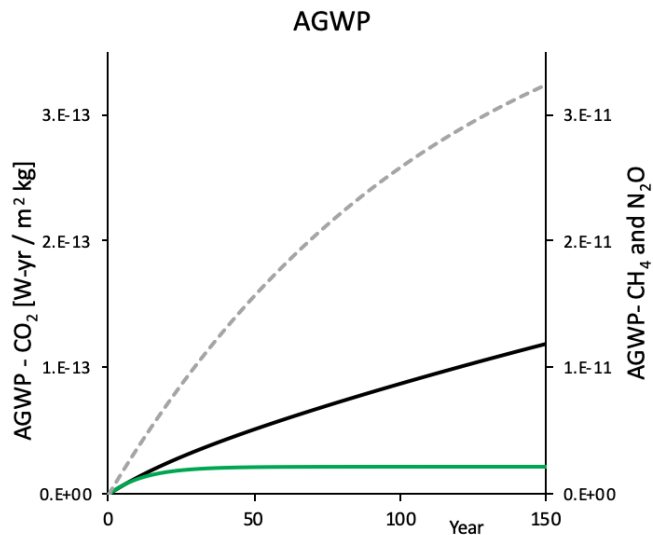
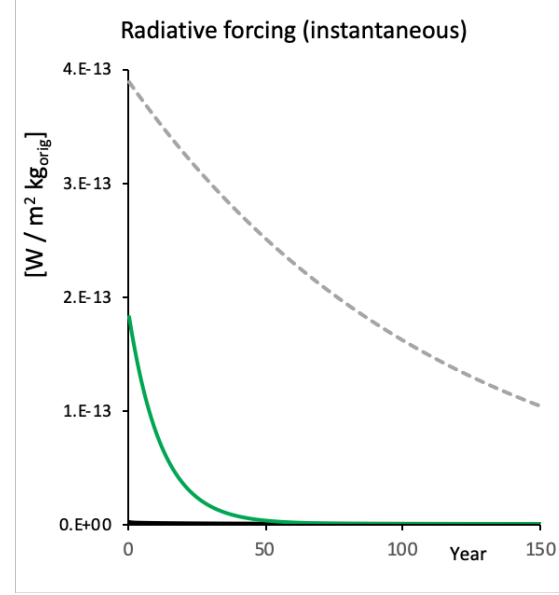
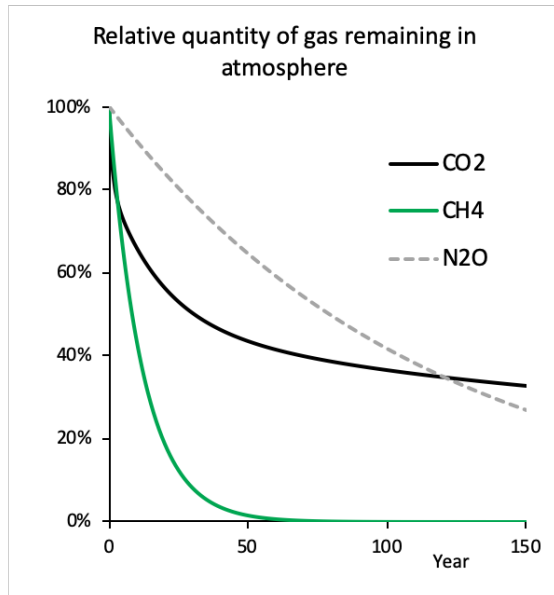
# Forecasting impacts – a case study of bioenergy

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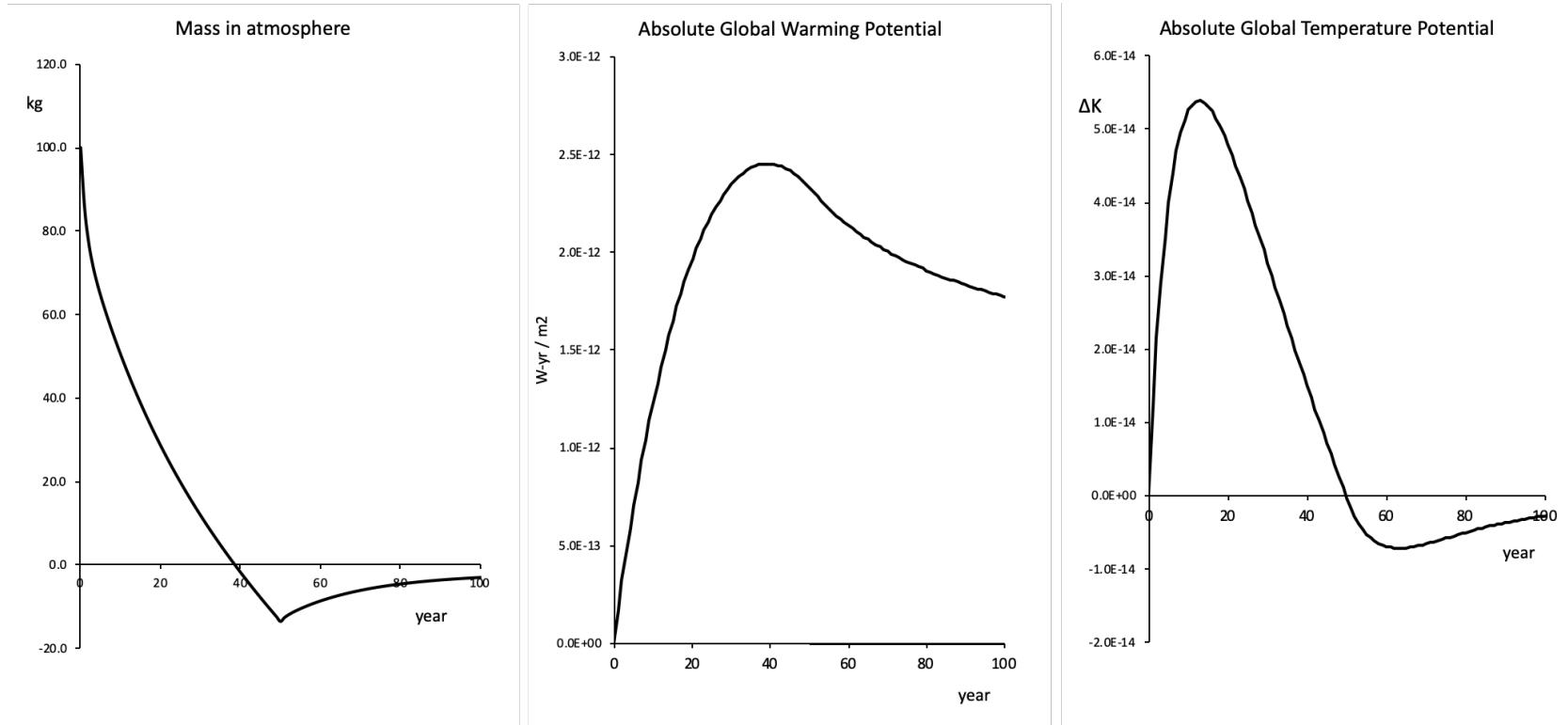
[https://researchportal.bath.ac.uk  
/en/persons/marcelle-mcmanus](https://researchportal.bath.ac.uk/en/persons/marcelle-mcmanus)

# Refresher – GHG characteristics of CO<sub>2</sub>, CH<sub>4</sub> & N<sub>2</sub>O



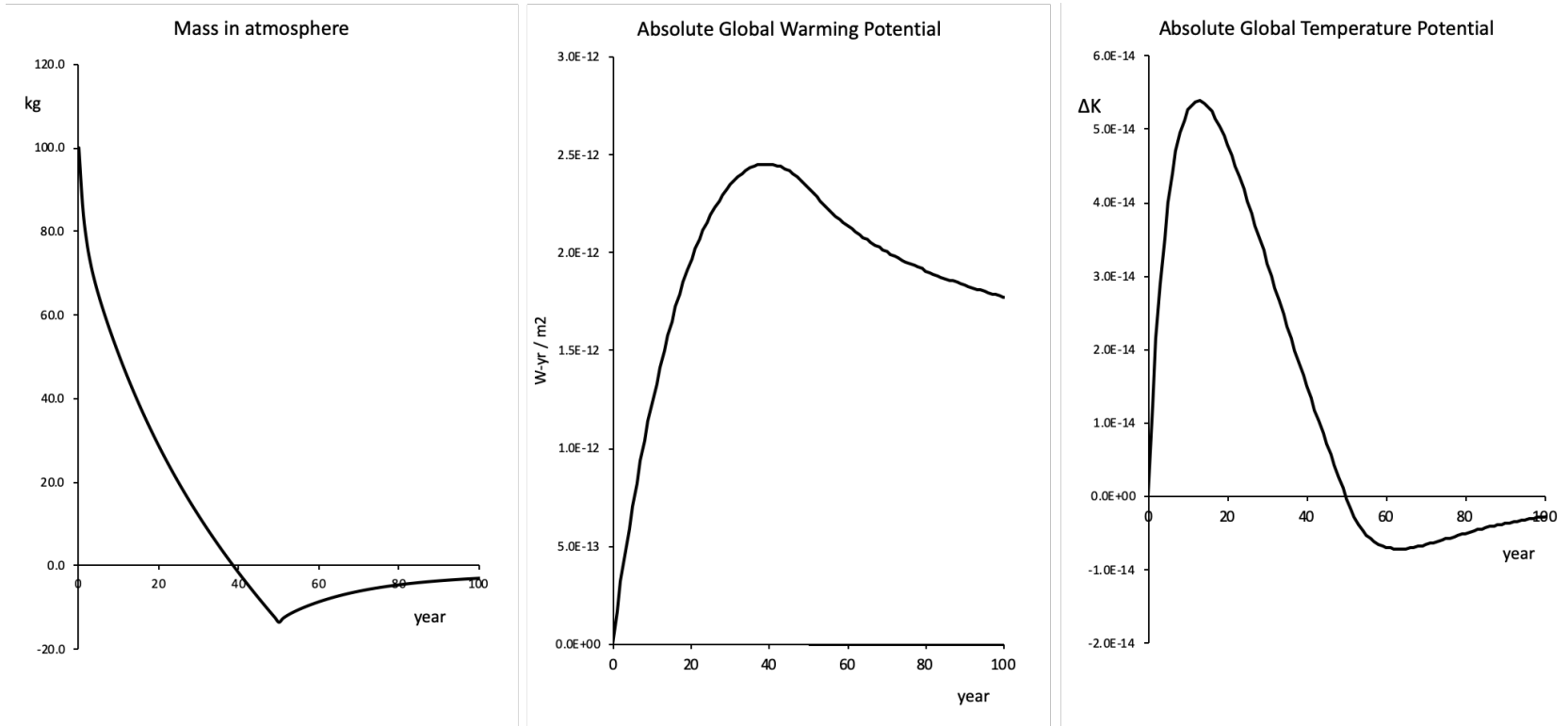
# CO<sub>2</sub> flux varying with time

100kg CO<sub>2</sub> emitted in year 0, 2kg/year CO<sub>2</sub> absorbed in years 1 to 51



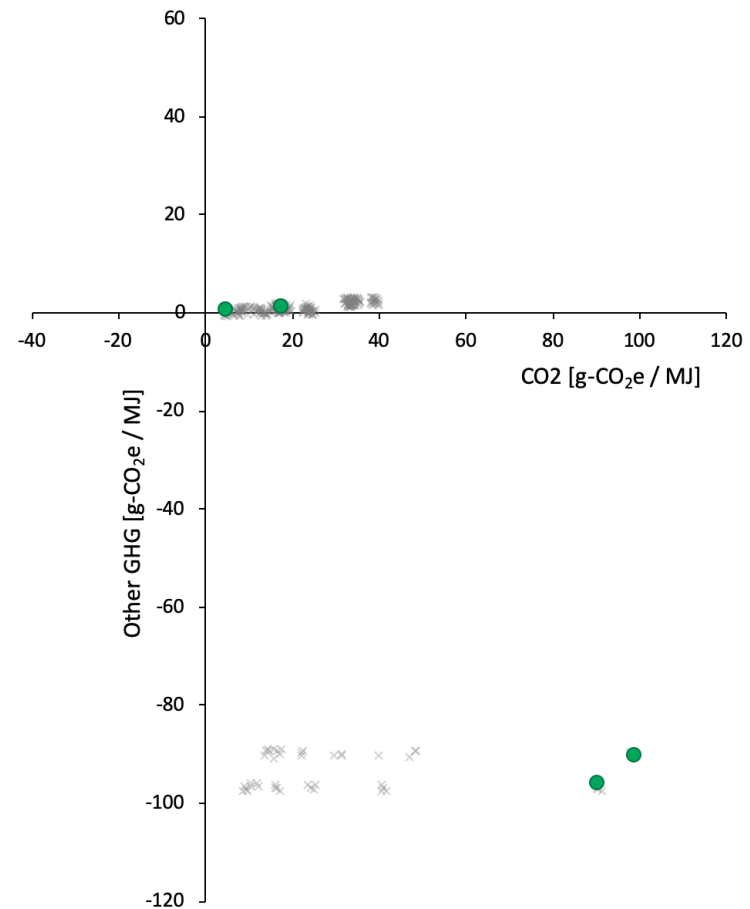
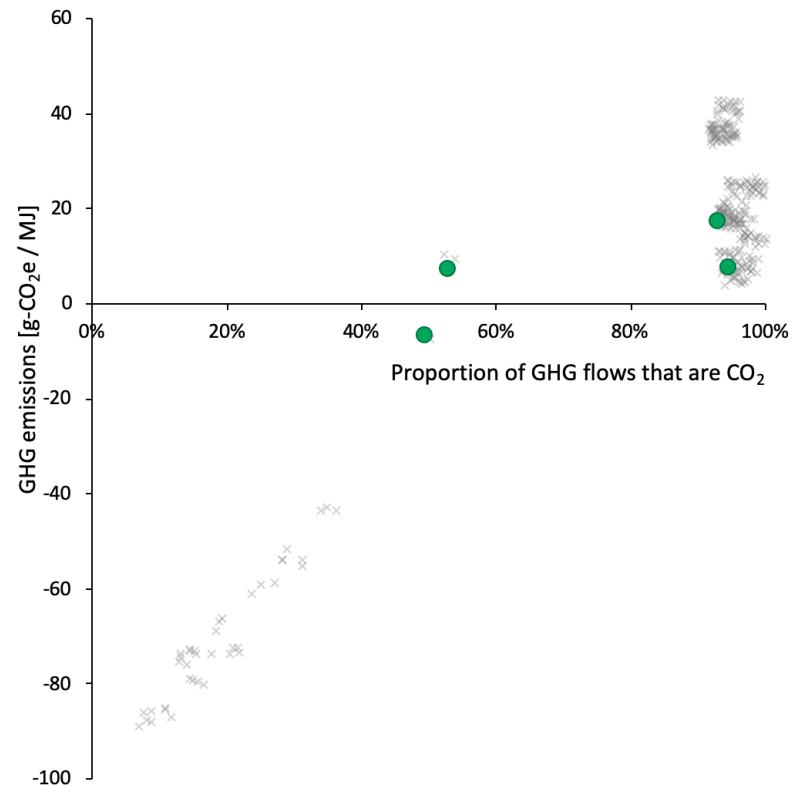
# CO<sub>2</sub> flux varying with time

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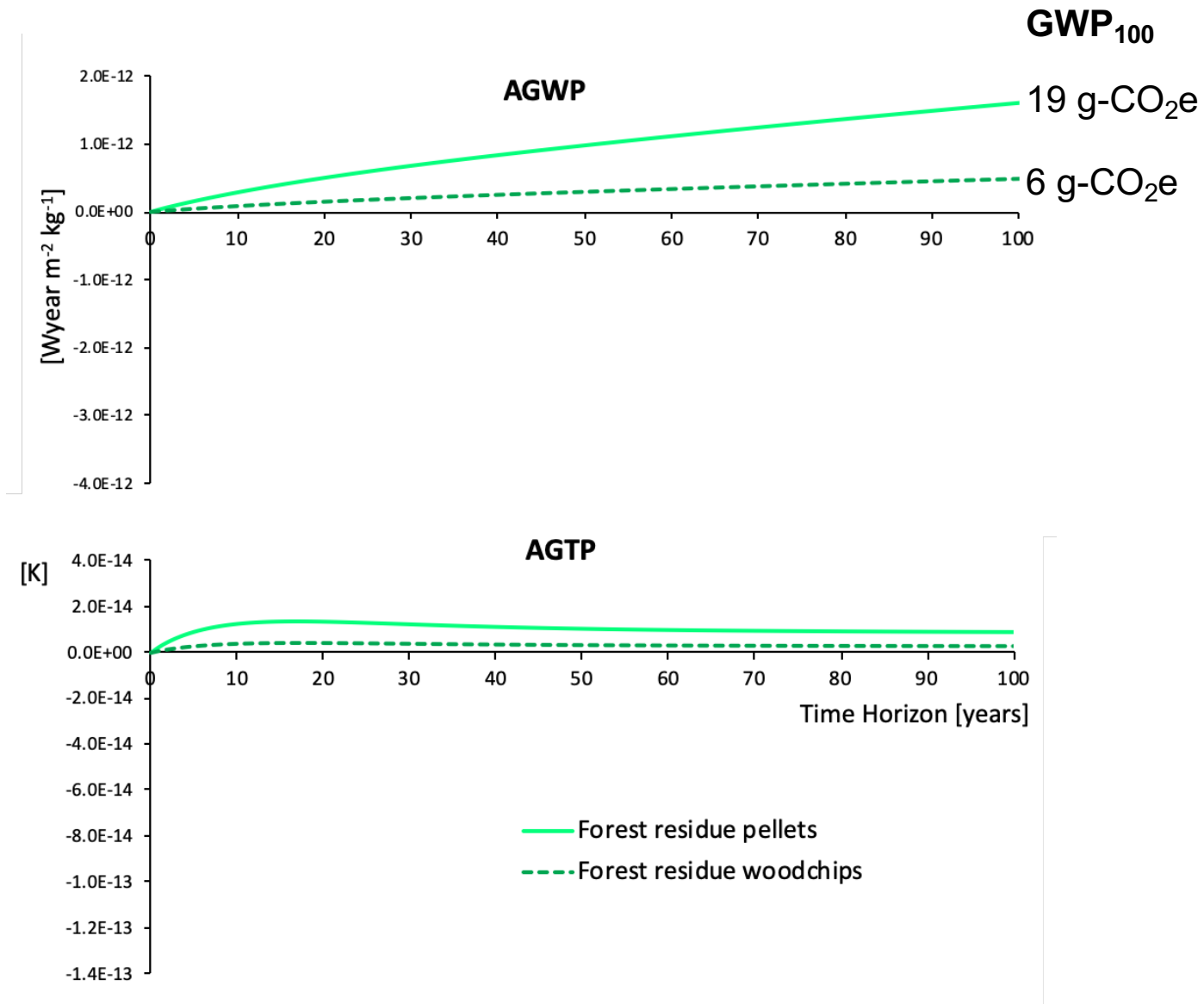
**Note that damage mechanisms are more complex and relate to range of effects!**

# GWP<sub>100</sub> results – bioenergy supplying district heating

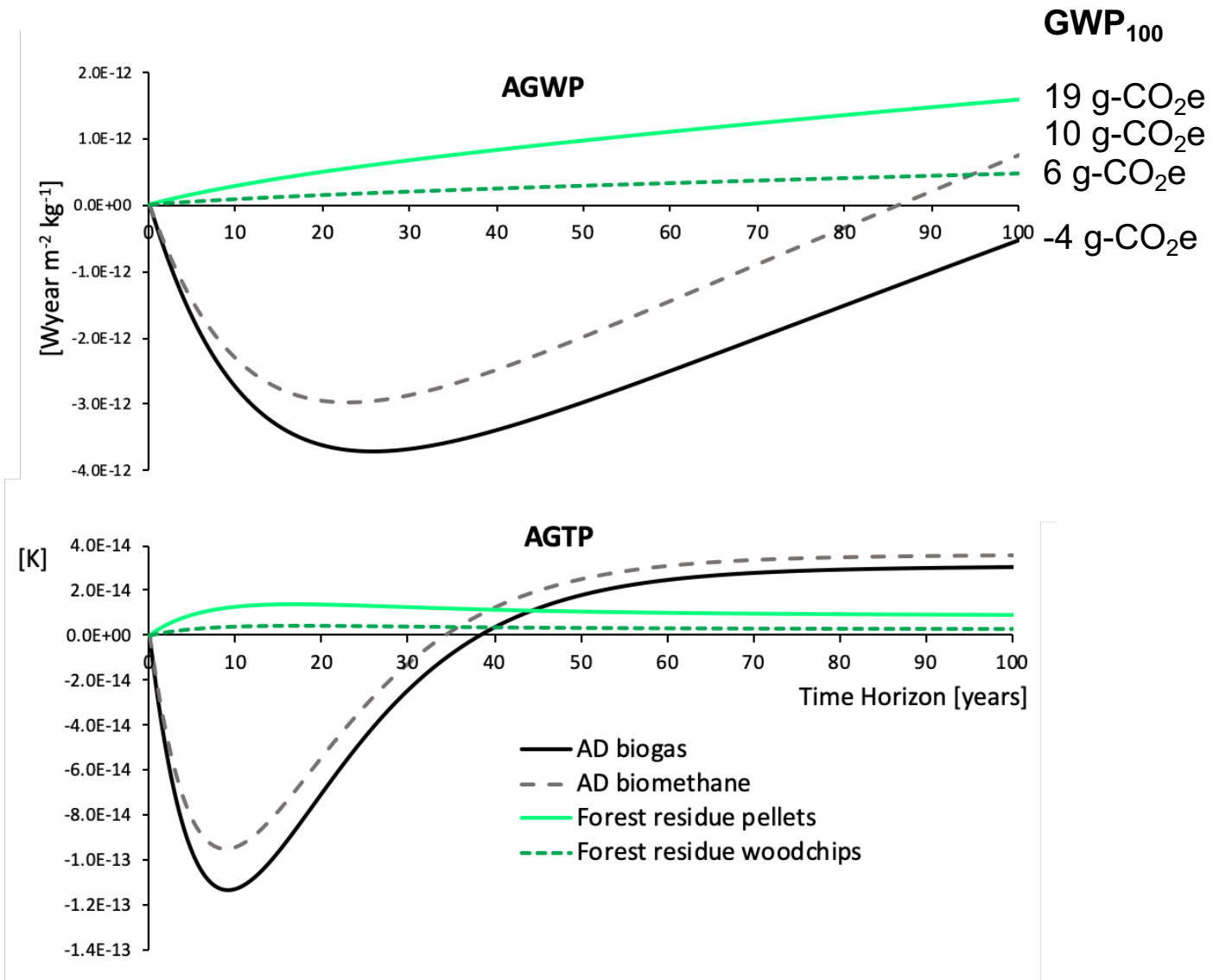


(data from Biograce-II)

# AGWP and AGTP variation with time



# AGWP and AGTP variation with time





# Recommendations

- The GWP100 metric has limitations that are well recognised in climate science but **typically not reflected in LCA work. This can be a problem as LCA results are often used as a decision-making tool.**
- For LCA work in which climate change is a key impact category, we recommend that warming and temperature effects over time are reported.
  - We have produced a simple spreadsheet to facilitate this.
- If this is not possible, it would be good to report GTP as well as GWP at appropriate (and consistent) time horizons.
- Or, otherwise to report gases separately (probably in addition to above) or note any caveats relating to the timing of impacts (e.g. if the GWP is substantially due to anything other than a CO2 pulse emission).

# Broader Conclusions

- Other (non-climate change) impacts may exhibit similar properties over different time scales. Future work might include investigating this further.
- More generally, we believe that this rationale supplies additional evidence / support / driver for activities to abate CO<sub>2</sub> emissions now rather than in the future. This effect of timing is potentially underplayed in IAMs that use a fixed time horizon.
- Rapid development of quick options and of long-term abatement (through forestry and bioenergy crops) should begin now even if future uses are less optimised.
- (Speculatively), perhaps policy that incentivises the actual abatement part of bioenergy (that could start to occur now) should be separate and additional to incentives for effectively using it (which might vary more and operate over different time scales).

# Thanks!

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temporary folder with spreadsheet: [tiny.cc/xicsfz](https://tiny.cc/xicsfz)

# GWP and GTP variation with time

